

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1 - 51 (Canceled)

52. (Currently Amended) A kit for treating cancer, comprising ~~a compound of Claim 1 a~~
peptide or peptidomimetic targeting moiety that binds to $\alpha_5\beta_1$ receptor, and a chelator,
wherein the targeting moiety is bound to the chelator and the compound has 0-1
linking groups between the targeting moiety and chelator, or a pharmaceutically
acceptable salt thereof, and at least one agent selected from the group consisting of a
chemotherapeutic agent and a radiosensitizer agent, or a pharmaceutically acceptable
salt thereof, and a pharmaceutically acceptable carrier.
53. (Currently Amended) A kit according to Claim 52 wherein said kit comprises a plurality
of separate containers, ~~wherein~~ at least one of said containers containsing a compound
~~of Claim 1, or a pharmaceutically acceptable salt thereof, and at least another of said~~
~~containers contains~~ one or more agents selected from the group consisting of a
chemotherapeutic agent and a radiosensitizer agent, or a pharmaceutically acceptable
salt thereof, ~~and a pharmaceutically acceptable carrier.~~
54. (Original) A kit according to Claim 52, wherein the chemotherapeutic agent is selected
from the group consisting of mitomycin, tretinoin, ribomustin, gemcitabine,
vincristine, etoposide, cladribine, mitobronitol, methotrexate, doxorubicin,
carboquone, pentostatin, nitracrine, zinostatin, cetorelix, letrozole, raltitrexed,
daunorubicin, fadrozole, fotemustine, thymalfasin, sobuzoxane, nedaplatin,
cytarabine, bicalutamide, vinorelbine, vesnarinone, aminoglutethimide, amsacrine,
proglumide, elliptinium acetate, ketanserin, doxifluridine, etretinate, isotretinoin,
streptozocin, nimustine, vindesine, flutamide, drogenil, butocin, carmofur, razoxane,

sizofilan, carboplatin, mitolactol, tegafur, ifosfamide, prednimustine, picibanil, levamisole, teniposide, improsulfan, enocitabine, lisuride, oxymetholone, tamoxifen, progesterone, mepitiostane, epitio Stanol, formestane, interferon-alpha, interferon-2 alpha, interferon-beta, interferon-gamma, colony stimulating factor-1, colony stimulating factor-2, denileukin diftotox, interleukin-2, and leutinizing hormone releasing factor.

55. (Original) A kit according to Claim 52, wherein the chemotherapeutic agent is selected from the group consisting of mitomycin, tretinoin, ribomustin, gemcitabine, vincristine, etoposide, cladribine, mitobronitol, methotrexate, doxorubicin, carboquone, pentostatin, nitracrine, zinostatin, cetorelix, letrozole, raltitrexed, daunorubicin, fadrozole, fotemustine, thymalfasin, sobuzoxane, nedaplatin, cytarabine, bicalutamide, vinorelbine, vesnarinone, aminoglutethimide, amsacrine, proglumide, elliptinium acetate, ketanserin, doxifluridine, etretinate, isotretinoin, streptozocin, nimustine, vindesine, flutamide, drogenil, butocin, carmofur, razoxane, sizofilan, carboplatin, mitolactol, tegafur, ifosfamide, prednimustine, picibanil, levamisole, teniposide, improsulfan, enocitabine, and lisuride.
56. (Currently Amended) A kit according to Claim 52 wherein the chemotherapeutic agent is selected from the group consisting of oxymetholone, tamoxifen, progesterone, mepitiostane, epitio Stanol, and formestane.
57. (Currently Amended) A kit according to Claim 52 wherein the chemotherapeutic agent is selected from the group consisting of interferon-alpha, interferon-2 alpha, interferon-beta, interferon-gamma, colony stimulating factor-1, colony stimulating factor-2, denileukin diftotox, interleukin-2, and leutinizing hormone releasing factor.

58. (Currently Amended) A kit according to Claim 52, wherein radiosensitizer agent is

selected from the group consisting of 2-(3-nitro-1,2,4-triazol-1-yl)-N-(2-methoxyethyl)acetamide, N-(3-nitro-4-quinoliny)-4-morpholinecarboxamidine, 3-amino-1,2,4-benzotriazine-1,4-dioxide, N-(2-hydroxyethyl)-2-nitroimidazole-1-acetamide, 1-(2-nitroimidazol-1-yl)-3-(1-piperidinyl)-2-propanol, and 1-(2-nitro-1-imidazolyl)-3-(1-aziridino)-2-propanol.

59 - 65 (Canceled)

66. (Currently Amended) A method according to Claim 62 83 wherein the cancer is selected

from the group consisting of carcinomas of the lung, breast, ovary, stomach, pancreas, larynx, esophagus, testes, liver, parotid, biliary tract, colon, rectum, cervix, uterus, endometrium, kidney, bladder, prostate, and thyroid, squamous cell carcinomas, adenocarcinomas, small cell carcinomas, melanomas, gliomas, and neuroblastomas.

67. (Currently Amended) A method according to Claim 62 83 wherein the chemotherapeutic

agent is selected from the group consisting of mitomycin, tretinoin, ribomustin, gemcitabine, vincristine, etoposide, cladribine, mitobronitol, methotrexate, doxorubicin, carboquone, pentostatin, nitracrine, zinostatin, cetorelix, letrozole, raltitrexed, daunorubicin, fadrozole, fotemustine, thymalfasin, sobuzoxane, nedaplatin, cytarabine, bicalutamide, vinorelbine, vesnarinone, aminoglutethimide, amsacrine, proglumide, elliptinium acetate, ketanserin, doxifluridine, etretinate, isotretinoin, streptozocin, nimustine, vindesine, flutamide, drogenil, butocin, carmofur, razoxane, sizofilan, carboplatin, mitolactol, tegafur, ifosfamide, prednimustine, picibanil, levamisole, teniposide, improsulfan, enocitabine, lisuride, oxymetholone, tamoxifen, progesterone, mepitiostane, epitiostanol, formestane, interferon-alpha, interferon-2 alpha, interferon-beta, interferon-gamma, colony

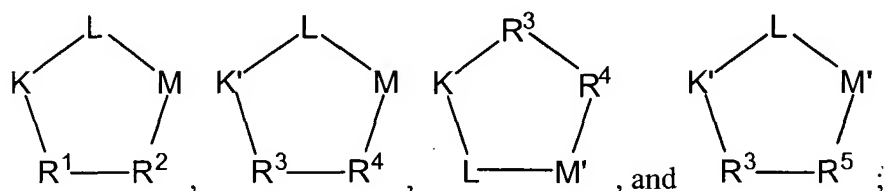
stimulating factor-1, colony stimulating factor-2, denileukin diftitox, interleukin-2, and leutinizing hormone releasing factor.

68. (Currently Amended) A method according to Celaim 62 83 wherein the radiosensitizer agent is selected from the group consisting of 2-(3-nitro-1,2,4-triazol-1-yl)-N-(2-methoxyethyl)acetamide, N-(3-nitro-4-quinoliny)-4-morpholinecarboxamidine, 3-amino-1,2,4-benzotriazine-1,4-dioxide, N-(2-hydroxyethyl)-2-nitroimidazole-1-acetamide, 1-(2-nitroimidazol-1-yl)-3-(1-piperidinyl)-2-propanol, and 1-(2-nitro-1-imidazolyl)-3-(1-aziridino)-2-propanol.
69. (Currently Amended) A process for the preparation of diagnostic or therapeutic metallopharmaceutical composition, said process comprising generating a macrostructure from a plurality of molecular components wherein the plurality of components includes a targeting moiety and a chelator, wherein the targeting moiety is a peptide or peptidomimetic, which is bound to the chelator, and binds to a $\alpha_5\beta_1$ receptor ~~that is upregulated during angiogenesis~~ and the compound has 0-1 linking groups between the targeting moiety and chelator.
70. (New) A composition comprising:
- (i) a metal;
 - (ii) at least one agent selected from the group consisting of a chemotherapeutic agent and a radiosensitizer agent, or a pharmaceutically acceptable salt thereof;
 - (iii) a peptide or peptidomimetic targeting moiety that binds to $\alpha_5\beta_1$ receptor, and a chelator, wherein the targeting moiety is bound to the chelator and the compound has 0-1 linking groups between the targeting moiety and chelator, or a pharmaceutically acceptable salt thereof; and
 - (iv) a pharmaceutically acceptable carrier.

71. (New) A composition according to Claim 70, wherein the targeting moiety, linking group, and chelator are of the formula:

$(Q)_d-L_n-Ch$ or $(Q)_d-L_n-(Ch)_d'$

wherein, Q is a peptide independently selected from the group:



K is an L-amino acid independently selected at each occurrence from the group: arginine, citrulline, N-methylarginine, lysine, homolysine, 2-aminoethylcysteine, δ -N-2-imidazolinylnornithine, δ -N-benzylcarbamoylornithine, and β -2-benzimidazolylacetyl-1,2-diaminopropionic acid;

K' is a D-amino acid independently selected at each occurrence from the group: arginine, citrulline, N-methylarginine, lysine, homolysine, 2-aminoethylcysteine, δ -N-2-imidazolinylnornithine, δ -N-benzylcarbamoylornithine, and β -2-benzimidazolylacetyl-1,2-diaminopropionic acid;

L is independently selected at each occurrence from the group: glycine, L-alanine, and D-alanine;

M is L-aspartic acid;

M' is D-aspartic acid;

R¹ is an amino acid substituted with 0-1 bonds to L_n, independently selected at each occurrence from the group: glycine, L-valine, D-valine, alanine, leucine, isoleucine, norleucine, 2-aminobutyric acid, 2-aminohexanoic acid, tyrosine, phenylalanine, thienylalanine, phenylglycine, cyclohexylalanine, homophenylalanine, 1-

naphthylalanine, lysine, serine, ornithine, 1,2-diaminobutyric acid, 1,2-diaminopropionic acid, cysteine, penicillamine, and methionine;

R^2 is an amino acid, substituted with 0-1 bonds to L_n , independently selected at each occurrence from the group: glycine, valine, alanine, leucine, isoleucine, norleucine, 2-aminobutyric acid, 2-aminohexanoic acid, tyrosine, L-phenylalanine, D-phenylalanine, thienylalanine, phenylglycine, biphenylglycine, cyclohexylalanine, homophenylalanine, L-1-naphthylalanine, D-1-naphthylalanine, lysine, serine, ornithine, 1,2-diaminobutyric acid, 1,2-diaminopropionic acid, cysteine, penicillamine, methionine, and 2-aminothiazole-4-acetic acid;

R^3 is an amino acid, substituted with 0-1 bonds to L_n , independently selected at each occurrence from the group: glycine, D-valine, D-alanine, D-leucine, D-isoleucine, D-norleucine, D-2-aminobutyric acid, D-2-aminohexanoic acid, D-tyrosine, D-phenylalanine, D-thienylalanine, D-phenylglycine, D-cyclohexylalanine, D-homophenylalanine, D-1-naphthylalanine, D-lysine, D-serine, D-ornithine, D-1,2-diaminobutyric acid, D-1,2-diaminopropionic acid, D-cysteine, D-penicillamine, and D-methionine;

R^4 is an amino acid, substituted with 0-1 bonds to L_n , independently selected at each occurrence from the group: glycine, D-valine, D-alanine, D-leucine, D-isoleucine, D-norleucine, D-2-aminobutyric acid, D-2-aminohexanoic acid, D-tyrosine, D-phenylalanine, D-thienylalanine, D-phenylglycine, D-cyclohexylalanine, D-homophenylalanine, D-1-naphthylalanine, D-lysine, D-serine, D-ornithine, D-1,2-diaminobutyric acid, D-1,2-diaminopropionic acid, D-cysteine, D-penicillamine, D-methionine, and 2-aminothiazole-4-acetic acid;

R^5 is an amino acid, substituted with 0-1 bonds to L_n , independently selected at each

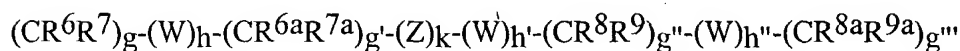
occurrence from the group: glycine, L-valine, L-alanine, L-leucine, L-isoleucine, L-norleucine, L-2-aminobutyric acid, L-2-aminohexanoic acid, L-tyrosine, L-phenylalanine, L-thienylalanine, L-phenylglycine, L-cyclohexylalanine, L-homophenylalanine, L-1-naphthylalanine, L-lysine, L-serine, L-ornithine, L-1,2-diaminobutyric acid, L-1,2-diaminopropionic acid, L-cysteine, L-penicillamine, L-methionine, and 2-aminothiazole-4-acetic acid;

provided that one of R^1 , R^2 , R^3 , R^4 , and R^5 in each Q is substituted with a bond to L_n ,

further provided that when R^2 is 2-aminothiazole-4-acetic acid, K is N-methylarginine, further provided that when R^4 is 2-aminothiazole-4-acetic acid, K and K' are N-methylarginine, and still further provided that when R^5 is 2-aminothiazole-4-acetic acid, K' is N-methylarginine;

d is selected from 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10;

L_n is a linking group having the formula:



provided that $g+h+g'+k+h'+g''+h''+g'''$ is other than 0;

W is independently selected at each occurrence from the group: O, S, NH, NHC(=O),

C(=O)NH, C(=O), C(=O)O, OC(=O), NHC(=S)NH, NHC(=O)NH, SO₂,

(OCH₂CH₂)_s, (CH₂CH₂O)_{s'}, (OCH₂CH₂CH₂)_{s''}, (CH₂CH₂CH₂O)_t, and (aa)_{t'};

aa is independently at each occurrence an amino acid;

Z is selected from the group: aryl substituted with 0-3 R^{10} , C_{3-10} cycloalkyl substituted with 0-3 R^{10} , and a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O and substituted with 0-3 R^{10} ; R^6 , R^{6a} , R^7 , R^{7a} , R^8 , R^{8a} , R^9 and R^{9a} are independently selected at each occurrence from the group: H, =O, COOH, SO₃H, PO₃H, C_1 - C_5 alkyl substituted with 0-3 R^{10} , aryl substituted with 0-3 R^{10} , benzyl substituted with 0-3 R^{10} , and C_1 - C_5 alkoxy substituted with 0-3 R^{10} , NHC(=O) R^{11} , C(=O)NHR¹¹, NHC(=O)NHR¹¹, NHR¹¹, R^{11} , and a bond to C_h ;

R^{10} is independently selected at each occurrence from the group: a bond to C_h , COOR¹¹, OH, NHR¹¹, SO₃H, PO₃H, aryl substituted with 0-3 R^{11} , C_1 -5 alkyl substituted with 0-1 R^{12} , C_1 -5 alkoxy substituted with 0-1 R^{12} , and a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O and substituted with 0-3 R^{11} ;

R^{11} is independently selected at each occurrence from the group: H, aryl substituted with 0-1 R^{12} , a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O and substituted with 0-1 R^{12} , C_{3-10} cycloalkyl substituted with 0-1 R^{12} , polyalkylene glycol substituted with 0-1 R^{12} , carbohydrate substituted with 0-1 R^{12} , cyclodextrin substituted with 0-1 R^{12} , amino acid substituted with 0-1 R^{12} , polycarboxyalkyl substituted with 0-1 R^{12} , polyazaalkyl substituted with 0-1 R^{12} , peptide substituted with 0-1 R^{12} , wherein the peptide is comprised of 2-10 amino acids, and a bond to C_h ;

R^{12} is a bond to C_h ;

k is selected from 0, 1, and 2;

h is selected from 0, 1, and 2;

h' is selected from 0, 1, 2, 3, 4, and 5;

h'' is selected from 0, 1, 2, 3, 4, and 5;

g is selected from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10;

g' is selected from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10;

g'' is selected from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10;

g''' is selected from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10;

s is selected from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10;

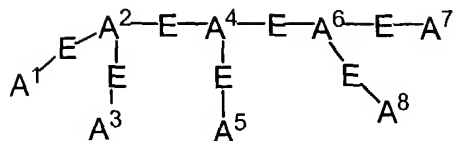
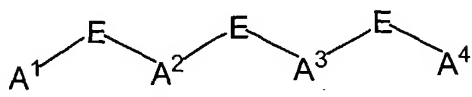
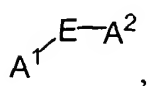
s' is selected from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10;

s'' is selected from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10;

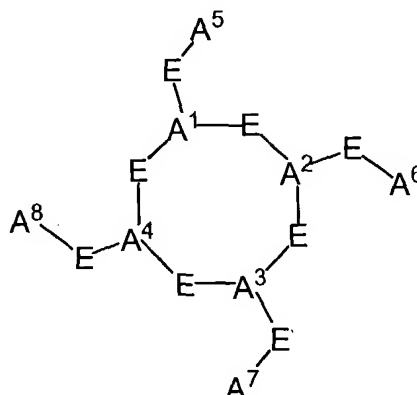
t is selected from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10;

t' is selected from 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10;

C_h is a metal bonding unit having a formula selected from the group:



, and



A¹, A², A³, A⁴, A⁵, A⁶, A⁷, and A⁸ are independently selected at each occurrence from the group N, NR¹³, NR¹³R¹⁴, S, SH, S(Pg), O, OH, PR¹³, PR¹³R¹⁴, P(O)R¹⁵R¹⁶, and a bond to L_n;

E is a bond, CH, or a spacer group independently selected at each occurrence from the group:

C₁-C₁₀ alkyl substituted with 0-3 R¹⁷, aryl substituted with 0-3 R¹⁷, C₃-₁₀ cycloalkyl substituted with 0-3 R¹⁷, heterocyclo-C₁-₁₀ alkyl substituted with 0-3 R¹⁷, wherein the heterocyclo group is a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O, C₆-₁₀ aryl-C₁-₁₀ alkyl substituted with 0-3 R¹⁷, C₁-₁₀ alkyl-C₆-₁₀ aryl- substituted with 0-3 R¹⁷, and a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O and substituted with 0-3 R¹⁷;

R¹³, and R¹⁴ are each independently selected from the group: a bond to L_n, hydrogen, C₁-C₁₀ alkyl substituted with 0-3 R¹⁷, aryl substituted with 0-3 R¹⁷, C₁-₁₀ cycloalkyl substituted with 0-3 R¹⁷, heterocyclo-C₁-₁₀ alkyl substituted with 0-3 R¹⁷, wherein the heterocyclo group is a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O, C₆-₁₀ aryl-C₁-₁₀ alkyl substituted with 0-3 R¹⁷, C₁-₁₀ alkyl-C₆-₁₀ aryl- substituted with 0-3 R¹⁷, a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O and substituted with 0-3 R¹⁷, and an electron, provided that when one of R¹³ or R¹⁴ is an electron, then the other is also an electron;

alternatively, R¹³ and R¹⁴ combine to form =C(R²⁰)(R²¹);

R¹⁵ and R¹⁶ are each independently selected from the group: a bond to L_n, -OH, C₁-C₁₀ alkyl substituted with 0-3 R¹⁷, C₁-C₁₀ alkyl substituted with 0-3 R¹⁷, aryl substituted with 0-3 R¹⁷, C₃-C₁₀ cycloalkyl substituted with 0-3 R¹⁷, heterocyclo-C₁-C₁₀ alkyl substituted with 0-3 R¹⁷, wherein the heterocyclo group is a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O, C₆-C₁₀ aryl-C₁-C₁₀ alkyl substituted with 0-3 R¹⁷, C₁-C₁₀ alkyl-C₆-C₁₀ aryl substituted with 0-3 R¹⁷, and a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O and substituted with 0-3 R¹⁷;

R¹⁷ is independently selected at each occurrence from the group: a bond to L_n, =O, F, Cl, Br, I, -CF₃, -CN, -CO₂R¹⁸, -C(=O)R¹⁸, -C(=O)N(R¹⁸)₂, -CHO, -CH₂OR¹⁸, -OC(=O)R¹⁸, -OC(=O)OR^{18a}, -OR¹⁸, -OC(=O)N(R¹⁸)₂, -NR¹⁹C(=O)R¹⁸, -NR¹⁹C(=O)OR^{18a}, -NR¹⁹C(=O)N(R¹⁸)₂, -NR¹⁹SO₂N(R¹⁸)₂, -NR¹⁹SO₂R^{18a}, -SO₃H, -SO₂R^{18a}, -SR¹⁸, -S(=O)R^{18a}, -SO₂N(R¹⁸)₂, -N(R¹⁸)₂, -NHC(=S)NHR¹⁸, =NOR¹⁸, NO₂, -C(=O)NHR¹⁸, -C(=O)NHN(R¹⁸)₂, -OCH₂CO₂H, 2-(1-morpholino)ethoxy, C₁-C₅ alkyl, C₂-C₄ alkenyl, C₃-C₆ cycloalkyl, C₃-C₆ cycloalkylmethyl, C₂-C₆ alkoxyalkyl, aryl substituted with 0-2 R¹⁸, and a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O;

R^{18} , R^{18a} , and R^{19} are independently selected at each occurrence from the group: a bond to

L_n , H, C₁-C₆ alkyl, phenyl, benzyl, C₁-C₆ alkoxy, halide, nitro, cyano, and trifluoromethyl;

P_g is a thiol protecting group;

R^{20} and R^{21} are independently selected from the group: H, C₁-C₁₀ alkyl, -CN, -CO₂ R^{25} , -

C(=O) R^{25} , -C(=O)N(R^{25})₂, C₂-C₁₀ 1-alkene substituted with 0-3 R^{23} , C₂-C₁₀ 1-

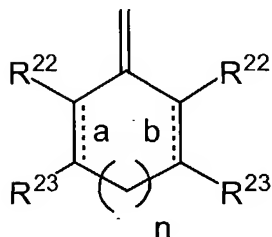
alkyne substituted with 0-3 R^{23} , aryl substituted with 0-3 R^{23} , unsaturated 5-10

membered heterocyclic ring system containing 1-4 heteroatoms independently

selected from N, S, and O and substituted with 0-3 R^{23} , and unsaturated C₃-10

carbocycle substituted with 0-3 R^{23} ;

alternatively, R^{20} and R^{21} , taken together with the divalent carbon radical to which they are attached form:



R^{22} and R^{23} are independently selected from the group: H, R^{24} , C₁-C₁₀ alkyl substituted

with 0-3 R^{24} , C₂-C₁₀ alkenyl substituted with 0-3 R^{24} , C₂-C₁₀ alkynyl substituted

with 0-3 R^{24} , aryl substituted with 0-3 R^{24} , a 5-10 membered heterocyclic ring

system containing 1-4 heteroatoms independently selected from N, S, and O and

substituted with 0-3 R^{24} , and C₃-10 carbocycle substituted with 0-3 R^{24} ;

alternatively, R^{22} , R^{23} taken together form a fused aromatic or a 5-10 membered

heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O;

a and **b** indicate the positions of optional double bonds and **n** is 0 or 1;

R^{24} is independently selected at each occurrence from the group: =O, F, Cl, Br, I, $-CF_3$, -

CN, $-CO_2R^{25}$, $-C(=O)R^{25}$, $-C(=O)N(R^{25})_2$, $-N(R^{25})_3^+$, $-CH_2OR^{25}$, $-OC(=O)R^{25}$, $-OC(=O)OR^{25a}$, $-OR^{25}$, $-OC(=O)N(R^{25})_2$, $-NR^{26}C(=O)R^{25}$, $-NR^{26}C(=O)OR^{25a}$, $-NR^{26}C(=O)N(R^{25})_2$, $-NR^{26}SO_2N(R^{25})_2$, $-NR^{26}SO_2R^{25a}$, $-SO_3H$, $-SO_2R^{25a}$, $-SR^{25}$, $-S(=O)R^{25a}$, $-SO_2N(R^{25})_2$, $-N(R^{25})_2$, $=NOR^{25}$, $-C(=O)NHOR^{25}$, $-OCH_2CO_2H$, and 2-(1-morpholino)ethoxy; and,

R^{25} , R^{25a} , and R^{26} are each independently selected at each occurrence from the group:

hydrogen and C_1 - C_6 alkyl;

and a pharmaceutically acceptable salt thereof.

72. (New) A composition according to Claim 71 wherein:

L is glycine;

R^1 is an amino acid, optionally substituted with a bond to L_n , independently selected at each occurrence from the group: L-valine, D-valine, alanine, leucine, isoleucine, norleucine, 2-aminobutyric acid, tyrosine, phenylalanine, phenylglycine, cyclohexylalanine, homophenylalanine, lysine, ornithine, 1,2-diaminobutyric acid, and 1,2-diaminopropionic acid;

R^2 is an amino acid, optionally substituted with a bond to L_n , independently selected at each occurrence from the group: valine, alanine, leucine, isoleucine, norleucine, 2-

aminobutyric acid, tyrosine, L-phenylalanine, D-phenylalanine, thienylalanine, phenylglycine, biphenylglycine, cyclohexylalanine, homophenylalanine, L-1-naphthylalanine, D-1-naphthylalanine, lysine, ornithine, 1,2-diaminobutyric acid, 1,2-diaminopropionic acid, and 2-aminothiazole-4-acetic acid;

R³ is an amino acid, optionally substituted with a bond to L_n, independently selected at each occurrence from the group: D-valine, D-alanine, D-leucine, D-isoleucine, D-norleucine, D-2-aminobutyric acid, D-tyrosine, D-phenylalanine, D-phenylglycine, D-cyclohexylalanine, D-homophenylalanine, D-lysine, D-serine, D-ornithine, D-1,2-diaminobutyric acid, and D-1,2-diaminopropionic acid;

R⁴ is an amino acid, optionally substituted with a bond to L_n, independently selected at each occurrence from the group: D-valine, D-alanine, D-leucine, D-isoleucine, D-norleucine, D-2-aminobutyric acid, D-tyrosine, D-phenylalanine, D-thienylalanine, D-phenylglycine, D-cyclohexylalanine, D-homophenylalanine, D-1-naphthylalanine, D-lysine, D-ornithine, D-1,2-diaminobutyric acid, D-1,2-diaminopropionic acid, and 2-aminothiazole-4-acetic acid;

R⁵ is an amino acid, optionally substituted with a bond to L_n, independently selected at each occurrence from the group: L-valine, L-alanine, L-leucine, L-isoleucine, L-norleucine, L-2-aminobutyric acid, L-tyrosine, L-phenylalanine, L-thienylalanine, L-phenylglycine, L-cyclohexylalanine, L-homophenylalanine, L-1-naphthylalanine, L-lysine, L-ornithine, L-1,2-diaminobutyric acid, L-1,2-diaminopropionic acid, and 2-aminothiazole-4-acetic acid;

d is selected from 1, 2, and 3;

W is independently selected at each occurrence from the group: O, NH, NHC(=O),

C(=O)NH, C(=O), C(=O)O, OC(=O), NHC(=S)NH, NHC(=O)NH, SO₂,

(OCH₂CH₂)_s, (CH₂CH₂O)_{s'}, (OCH₂CH₂CH₂)_{s''}, and (CH₂CH₂CH₂O)_t.

Z is selected from the group: aryl substituted with 0-1 R¹⁰, C₃₋₁₀ cycloalkyl substituted

with 0-1 R¹⁰, and a 5-10 membered heterocyclic ring system containing 1-4

heteroatoms independently selected from N, S, and O and substituted with 0-1 R¹⁰;

R⁶, R^{6a}, R⁷, R^{7a}, R⁸, R^{8a}, R⁹, and R^{9a} are independently selected at each occurrence from

the group: H, =O, COOH, SO₃H, C₁₋₅ alkyl substituted with 0-1 R¹⁰, aryl

substituted with 0-1 R¹⁰, benzyl substituted with 0-1 R¹⁰, and C₁₋₅ alkoxy

substituted with 0-1 R¹⁰, NHC(=O)R¹¹, C(=O)NHR¹¹, NHC(=O)NHR¹¹, NHR¹¹,

R¹¹, and a bond to C_H;

R¹⁰ is independently selected at each occurrence from the group: COOR¹¹, OH, NHR¹¹,

SO₃H, aryl substituted with 0-1 R¹¹, a 5-10 membered heterocyclic ring system

containing 1-4 heteroatoms independently selected from N, S, and O and substituted

with 0-1 R¹¹, C₁₋₅ alkyl substituted with 0-1 R¹², C₁₋₅ alkoxy substituted with

0-1 R¹², and a bond to C_H;

R¹¹ is independently selected at each occurrence from the group: H, aryl substituted with 0-

1 R¹², a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms

independently selected from N, S, and O and substituted with 0-1 R¹², polyalkylene

glycol substituted with 0-1 R¹², carbohydrate substituted with 0-1 R¹², cyclodextrin

substituted with 0-1 R¹², amino acid substituted with 0-1 R¹², and a bond to C_H;

k is 0 or 1;

h is 0 or 1;

h' is 0 or 1;

s is selected from 0, 1, 2, 3, 4, and 5;

s' is selected from 0, 1, 2, 3, 4, and 5;

s'' is selected from 0, 1, 2, 3, 4, and 5;

t is selected from 0, 1, 2, 3, 4, and 5;

A¹, A², A³, A⁴, A⁵, A⁶, A⁷, and A⁸ are independently selected at each occurrence from the

group: NR¹³, NR¹³R¹⁴, S, SH, S(Pg), OH, and a bond to L_n;

E is a bond, CH, or a spacer group independently selected at each occurrence from the group:

C₁-C₁₀ alkyl substituted with 0-3 R¹⁷, aryl substituted with 0-3 R¹⁷, C₃-10

cycloalkyl substituted with 0-3 R¹⁷, and a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O and substituted with 0-3 R¹⁷;

R¹³, and R¹⁴ are each independently selected from the group: a bond to L_n, hydrogen, C₁-

C₁₀ alkyl substituted with 0-3 R¹⁷, aryl substituted with 0-3 R¹⁷, a 5-10 membered heterocyclic ring system containing 1-4 heteroatoms independently selected from N, S, and O and substituted with 0-3 R¹⁷, and an electron, provided that when one of R¹³ or R¹⁴ is an electron, then the other is also an electron;

alternatively, R¹³ and R¹⁴ combine to form =C(R²⁰)(R²¹);

R¹⁷ is independently selected at each occurrence from the group: a bond to L_n, =O, F, Cl,

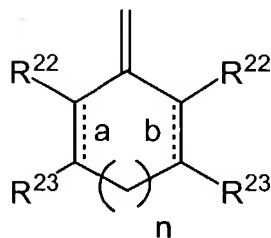
Br, I, -CF₃, -CN, -CO₂R¹⁸, -C(=O)R¹⁸, -C(=O)N(R¹⁸)₂, -CH₂OR¹⁸, -OC(=O)R¹⁸,

-OC(=O)OR^{18a}, -OR¹⁸, -OC(=O)N(R¹⁸)₂, -NR¹⁹C(=O)R¹⁸, -NR¹⁹C(=O)OR^{18a}, -
 NR¹⁹C(=O)N(R¹⁸)₂, -NR¹⁹SO₂N(R¹⁸)₂, -NR¹⁹SO₂R^{18a}, -SO₃H, -SO₂R^{18a}, -
 S(=O)R^{18a}, -SO₂N(R¹⁸)₂, -N(R¹⁸)₂, -NHC(=S)NHR¹⁸, =NOR¹⁸, -
 C(=O)NHN(R¹⁸)R^{18a}, -OCH₂CO₂H, and 2-(1-morpholino)ethoxy;

R¹⁸, R^{18a}, and R¹⁹ are independently selected at each occurrence from the group: a bond to
 L_n, H, and C₁-C₆ alkyl;

R²⁰ and R²¹ are independently selected from the group: H, C₁-C₅ alkyl, -CO₂R²⁵, C₂-C₅
 1-alkene substituted with 0-3 R²³, C₂-C₅ 1-alkyne substituted with 0-3 R²³, aryl
 substituted with 0-3 R²³, and unsaturated 5-10 membered heterocyclic ring system
 containing 1-4 heteroatoms independently selected from N, S, and O and substituted
 with 0-3 R²³;

alternatively, R²⁰ and R²¹, taken together with the divalent carbon radical to which they are
 attached form:



R²² and R²³ are independently selected from the group: H, and R²⁴;

alternatively, R²², R²³ taken together form a fused aromatic or a 5-10 membered

heterocyclic ring system containing 1-4 heteroatoms independently selected from N,
 S, and O;

R^{24} is independently selected at each occurrence from the group: $-\text{CO}_2R^{25}$, -

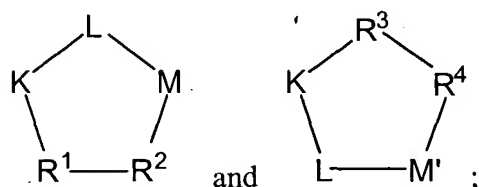
$\text{C}(=\text{O})\text{N}(\text{R}^{25})_2$, $-\text{CH}_2\text{OR}^{25}$, $-\text{OC}(=\text{O})\text{R}^{25}$, $-\text{OR}^{25}$, $-\text{SO}_3\text{H}$, $-\text{N}(\text{R}^{25})_2$, and -

$\text{OCH}_2\text{CO}_2\text{H}$; and,

R^{25} is independently selected at each occurrence from the group: H and $\text{C}_1\text{-C}_3$ alkyl.

73. (New) A composition according to Claim 72 wherein:

Q is a peptide selected from the group:



R^1 is L-valine, D-valine, D-lysine optionally substituted on the ϵ amino group with a bond to L_n or L-lysine optionally substituted on the ϵ amino group with a bond to L_n ;

R^2 is L-phenylalanine, D-phenylalanine, D-1-naphthylalanine, 2-aminothiazole-4-acetic acid, L-lysine optionally substituted on the ϵ amino group with a bond to L_n or tyrosine, the tyrosine optionally substituted on the hydroxy group with a bond to L_n ;

R^3 is D-valine, D-phenylalanine, or L-lysine optionally substituted on the ϵ amino group with a bond to L_n ;

R^4 is D-phenylalanine, D-tyrosine substituted on the hydroxy group with a bond to L_n , or L-lysine optionally substituted on the ϵ amino group with a bond to L_n ;

provided that one of R^1 and R^2 in each Q is substituted with a bond to L_n , and further

provided that when R^2 is 2-aminothiazole-4-acetic acid, K is N-methylarginine;

d is 1 or 2;

W is independently selected at each occurrence from the group: NHC(=O) , C(=O)NH ,

C(=O) , $(\text{CH}_2\text{CH}_2\text{O})_{\text{s'}}$, and $(\text{CH}_2\text{CH}_2\text{CH}_2\text{O})_{\text{t}}$;

R^6 , $\text{R}^{6\text{a}}$, R^7 , $\text{R}^{7\text{a}}$, R^8 , $\text{R}^{8\text{a}}$, R^9 , and $\text{R}^{9\text{a}}$ are independently selected at each occurrence from

the group: H, NHC(=O)R^{11} , and a bond to C_h ;

k is 0;

h'' is selected from 0, 1, 2, and 3;

g is selected from 0, 1, 2, 3, 4, and 5;

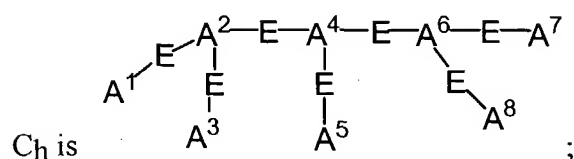
g' is selected from 0, 1, 2, 3, 4, and 5;

g'' is selected from 0, 1, 2, 3, 4, and 5;

g''' is selected from 0, 1, 2, 3, 4, and 5;

s' is 1 or 2;

t is 1 or 2;



A^1 is selected from the group: OH, and a bond to L_n ;

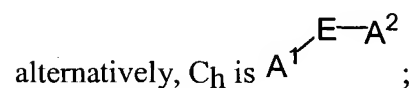
A^2 , A^4 , and A^6 are each N;

A^3 , A^5 , and A^8 are each OH;

A^7 is a bond to L_n or NH-bond to L_n ;

E is a C_2 alkyl substituted with 0-1 R^{17} ;

R^{17} is =O;



A^1 is NH_2 or $N=C(R^{20})(R^{21})$;

E is a bond;

A^2 is NHR^{13} ;

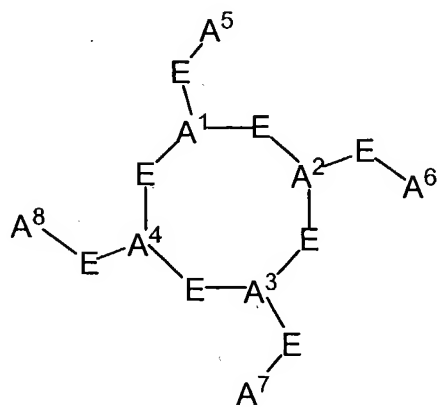
R^{13} is a heterocycle substituted with R^{17} , the heterocycle being selected from pyridine and pyrimidine;

R^{17} is selected from a bond to L_n , $C(=O)NHR^{18}$, and $C(=O)R^{18}$;

R^{18} is a bond to L_n ;

R^{24} is selected from the group: $-CO_2R^{25}$, $-OR^{25}$, $-SO_3H$, and $-N(R^{25})_2$;

R^{25} is independently selected at each occurrence from the group: hydrogen and methyl;



alternatively, C_h is

A^1 , A^2 , A^3 , and A^4 are each N;

A^5 , A^6 , and A^8 are each OH;

A^7 is a bond to L_n ;

E is a C_2 alkyl substituted with 0-1 R^{17} ; and,

R^{17} is =O.

74. (New) A composition according to Claim 70, wherein the metal is selected from the

group: ^{99m}Tc , ^{95}Tc , ^{111}In , ^{62}Cu , ^{64}Cu , ^{67}Ga , and ^{68}Ga .

75. (New) A composition according to Claim 74, further comprising a first ancillary ligand and a second ancillary ligand capable of stabilizing the composition.

76. (New) A composition according to Claim 74 comprising a compound selected from the group:

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{cyclo}(\text{Arg-Gly-Asp-D-Tyr}(\text{N}-[[5\text{-[carbonyl]-2-pyridinyl}] \text{ diazenido}]-3\text{-aminopropyl})\text{-Val}));$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPMS})(\text{cyclo}(\text{Arg-D-Val-D-Tyr}(\text{N}-[[5\text{-[carbonyl]-2-pyridinyl}] \text{ diazenido}]-3\text{-aminopropyl})\text{-D-Asp-Gly}));$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPDS})(\text{cyclo}(\text{Arg-D-Val-D-Tyr}(\text{N}-[[5\text{-[carbonyl]-2-pyridinyl}] \text{ diazenido}]-3\text{-aminopropyl})\text{-D-Asp-Gly}));$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{cyclo}(\text{Arg-D-Val-D-Tyr}(\text{N}-[[5\text{-[carbonyl]-2-pyridinyl}] \text{ diazenido}]-3\text{-aminopropyl})\text{-D-Asp-Gly}));$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{cyclo}(\text{Arg-Gly-Asp-D-Phe-Lys}(\text{N}-[[5\text{-[carbonyl]-2-pyridinyl}] \text{ diazenido}]));$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{cyclo}(\text{Arg-Gly-Asp-D-Tyr-Lys}(\text{N}-[[5\text{-[carbonyl]-2-pyridinyl}] \text{ diazenido}]));$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})([2-[[[5\text{-[carbonyl]-2-pyridinyl}] \text{ hydrazono}] \text{ methyl}]\text{-benzenesulfonic acid}]\text{-Phe-Glu}(\text{cyclo}\{\text{Lys-Arg-Gly-Asp-D-Phe}\})\text{-cyclo}\{\text{Lys-Arg-Gly-Asp-D-Phe}\});$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{cyclo}\{\text{Arg-Gly-Asp-D-Nal-Lys}([2-[[[5\text{-[carbonyl]-2-pyridinyl}] \text{ hydrazono}] \text{ methyl}]\text{-benzenesulfonic acid}])\});$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})([2-[[[5-[\text{carbonyl}]-2\text{-pyridinyl}]\text{hydrazono}]\text{methyl}]\text{-benzenesulfonic acid}]\text{-Glu}(\text{cyclo}\{\text{Lys-Arg-Gly-Asp-D-Nal}\})\text{-cyclo}\{\text{Lys-Arg-Gly-Asp-D-Nal}\}));$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{cyclo}(\text{Arg-Gly-Asp-D-Tyr}((\text{N}-[[5-[\text{carbonyl}]-2\text{-pyridinyl}]\text{diazenido}]\text{-18-amino-14-aza-4,7,10-oxy-15-oxo-octadecoyl})\text{-3-aminopropyl})\text{-Val}));$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{N}-[[5-[\text{carbonyl}]-2\text{-pyridinyl}]\text{diazenido}]\text{-Glu}(\text{O-cyclo}(\text{Lys-Arg-Gly-Asp-D-Phe}))\text{-O-cyclo}(\text{Lys-Arg-Gly-Asp-D-Phe}));$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{N}-[[5-[\text{carbonyl}]-2\text{-pyridinyl}]\text{diazenido}]\text{-Glu}(\text{O-cyclo}(\text{D-Tyr}(3\text{-aminopropyl})\text{-Val-Arg-Gly-Asp}))\text{-O-cyclo}(\text{D-Tyr}(3\text{-aminopropyl})\text{-Val-Arg-Gly-Asp}));$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{cyclo}(\text{Arg-Gly-Asp-Lys}(\text{N}-[[5-[\text{carbonyl}]-2\text{-pyridinyl}]\text{diazenido}])\text{-D-Val}));$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{cyclo}\{\text{D-Lys}([2-[[[5-[\text{carbonyl}]-2\text{-pyridinyl}]\text{hydrazono}]\text{methyl}]\text{-benzenesulfonic acid}])\text{-D-Phe-D-Asp-Gly-Arg}\});$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})([2-[[[5-[\text{carbonyl}]-2\text{-pyridinyl}]\text{hydrazono}]\text{methyl}]\text{-benzenesulfonic acid}]\text{-Glu}(\text{cyclo}\{\text{D-Lys-D-Phe-D-Asp-Gly-Arg}\})\text{-cyclo}\{\text{D-Lys-D-Phe-D-Asp-Gly-Arg}\});$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{cyclo}\{\text{D-Phe-D-Lys}([2-[[[5-[\text{carbonyl}]-2\text{-pyridinyl}]\text{hydrazono}]\text{methyl}]\text{-benzenesulfonic acid}])\text{-D-Asp-Gly-Arg}\});$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{cyclo}(\text{N-Me-Arg-Gly-Asp-ATA-D-Lys}(\text{N}-[[5-[\text{carbonyl}]-2\text{-pyridinyl}]\text{diazenido}]]));$

$^{99m}\text{Tc}(\text{tricine})(\text{TPPTS})(\text{cyclo}\{\text{Cit-Gly-Asp-D-Phe-Lys}([2-[[[5-[\text{carbonyl}]-2\text{-pyridinyl}]\text{hydrazono}]\text{methyl}]\text{-benzenesulfonic acid}])\});$

$^{99m}\text{Tc}(\text{tricine})(1,2,4\text{-triazole})(\text{cyclo}(\text{Arg-Gly-Asp-D-Tyr}(\text{N}-[[5\text{-[carbonyl]}-2\text{-}$

$\text{pyridinyl}]\text{diazenido}]\text{-3-aminopropyl})\text{-Val}))$;

$(\text{DOTA-}^{111}\text{In})\text{-Glu}(\text{cyclo}\{\text{Lys-Arg-Gly-Asp-D-Phe}\})\text{-cyclo}\{\text{Lys-Arg-Gly-Asp-D-Phe}\}$;

$\text{cyclo}(\text{Arg-Gly-Asp-D-Phe-Lys}(\text{DTPA-}^{111}\text{In}))$; and

$\text{cyclo}(\text{Arg-Gly-Asp-D-Phe-Lys})_2(\text{DTPA-}^{111}\text{In})$.

77. (New) A composition according to Claim 70, wherein the metal is selected from the

group: ^{33}P , ^{125}I , ^{186}Re , ^{188}Re , ^{153}Sm , ^{166}Ho , ^{177}Lu , ^{149}Pm , ^{90}Y , ^{212}Bi , ^{103}Pd ,

^{109}Pd , ^{159}Gd , ^{140}La , ^{198}Au , ^{199}Au , ^{169}Yb , ^{175}Yb , ^{165}Dy , ^{166}Dy , ^{67}Cu , ^{105}Rh ,

^{111}Ag , and ^{192}Ir .

78. (New) A composition according to Claim 77 comprising a compound selected from the

group:

$\text{cyclo}(\text{Arg-Gly-Asp-D-Phe-Lys}(\text{DTPA-}^{153}\text{Sm}))$;

$\text{cyclo}(\text{Arg-Gly-Asp-D-Phe-Lys})_2(\text{DTPA-}^{153}\text{Sm})$;

$\text{cyclo}(\text{Arg-Gly-Asp-D-Tyr}(\text{N-DTPA}^{153}\text{Sm})\text{-3-aminopropyl})\text{-Val}$;

$\text{cyclo}(\text{Arg-Gly-Asp-D-Phe-Lys}(\text{DTPA-}^{177}\text{Lu}))$;

$(\text{DOTA-}^{177}\text{Lu})\text{-Glu}(\text{cyclo}\{\text{Lys-Arg-Gly-Asp-D-Phe}\})\text{-cyclo}\{\text{Lys-Arg-Gly-Asp-D-Phe}\}$;

$\text{cyclo}(\text{Arg-Gly-Asp-D-Phe-Lys})_2(\text{DTPA-}^{177}\text{Lu})$;

$\text{cyclo}(\text{Arg-Gly-Asp-D-Tyr}(\text{N-DTPA}^{177}\text{Lu})\text{-3-aminopropyl})\text{-Val}$; and

$(\text{DOTA-}^{90}\text{Y})\text{-Glu}(\text{cyclo}\{\text{Lys-Arg-Gly-Asp-D-Phe}\})\text{-cyclo}\{\text{Lys-Arg-Gly-Asp-D-Phe}\}$.

79. (New) A composition according to Claim 70, wherein the metal is selected from the

group: Gd(III) , Dy(III) , Fe(III) , and Mn(II) .

80. (New) A composition according to Claim 79 wherein the compound is:

cyclo(Arg-Gly-Asp-D-Tyr(N-DTPA(Gd(III))-3-aminopropyl)-Val).

81. (New) A composition according to Claim 70, wherein the metal is selected from the group: Re, Sm, Ho, Lu, Pm, Y, Bi, Pd, Gd, La, Au, Au, Yb, Dy, Cu, Rh, Ag, and Ir.
82. (New) A composition according to Claim 70, further comprising a therapeutic isotope selected from the group: ^{35}S , ^{32}P , ^{125}I , ^{131}I , and ^{211}At .
83. (New) A method of treating cancer in a patient, comprising:
administering a radiopharmaceutical comprising:
- (i) a metal;
 - (ii) at least one agent selected from the group consisting of a chemotherapeutic agent and a radiosensitizer agent, or a pharmaceutically acceptable salt thereof;
 - (iii) a peptide or peptidomimetic targeting moiety that binds to $\alpha_5\beta_1$ receptor, and a chelator, wherein the targeting moiety is bound to the chelator and the compound has 0-1 linking groups between the targeting moiety and chelator, or a pharmaceutically acceptable salt thereof; and
 - (iv) a pharmaceutically acceptable carrier, to a patient.